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ABSTRACT

An instrument was developed to measure the resourcefulness and self-directedness of students in maintaining their motivation on academic goal tasks. The Academic Volitional Strategy Inventory (AVSI) is a self-report instrument designed to assess the management of emotion and motivation by college students during the goal-striving process. An initial version was tested and revised, and the revised version was completed by 463 college students. Further revisions were tested with 246 college students. Analysis of these results suggested a three-factor structure with three distinct families of volitional strategies that were consistent with previous research done in this area. These psychometric assessments provide evidence for the usefulness of the AVSI in measuring self-regulatory actions related to maintaining effort and motivation on goal-directed activity. (Contains 6 tables and 32 references.) (SLD)

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Maintaining motivation and regulating emotion:

Measuring individual differences in academic volitional strategies

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Maintaining motivation and regulating emotion:

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Research into individual differences in academic performance has indicated that an important aspect of positive educational outcomes is the extent to which students engage in self-regulatory activities. Zimmerman (1989) defines self-regulation as "the degree to which individuals are metacognitively, motivationally, and behaviorally active participants in their own learning process" (p 329). Guided by his or her goals, the self-regulated student is characterized as one who is aware not only of task requirements, but of one's own needs with regard to optimal learning experiences. The deployment of various cognitive and metacognitive strategies, progress monitoring, and management of time and study environment are frequently described activities of self-regulated students as they seek the attainment of academic goals (e.g., Schunk, 1989, Weinstein & Mayer, 1986; Zimmerman, 1989).

Self-regulatory activities examined in recent studies have focused primarily on the use of cognitive and metacognitive strategies and their effect on the direct enhancement of student learning. Included in this line of research have been strategies related to the elaboration, organization, and rehearsal of academic material within the context of reading, note-taking, and test preparation, as well as those strategies focused on students' self-monitoring of their progress.

Less examined are self-regulatory activities that may be thought of as protecting the intention to learn. The mobilization and maintenance of one's attention and effort toward goal attainment are necessary prerequisites to positive learning outcomes (Corno, 1993; Snow, Corno, & Jackson, 1996). When confronted with difficulty or distraction during the goal-striving process, strategic action may be required to initiate or maintain on-task effort thereby protecting the initial zeal that accompanied goal selection and commitment. Few studies have examined whether one's ongoing effort and persistence with task requirements is supplemented by self-regulation, and if so what form it takes (Wolters, 1998). Self-regulatory control of this nature is conceptualized as volitional and is suggested to play a key role in

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student performance outcomes, especially when goal attainment requires extended concentration and effort over lengthy periods of time (Corno, 1993; Corno & Kanfer, 1993; Heckhausen & Kuhl, 1985; Kuhl, 1985).

Discipline, self-directedness, resourcefulness, and effort are considered to be elements conducive to self-regulatory control by individuals (Snow, et al., 1996). The tendency of such elements to impact or mediate goal attainment represents a volitional aspect to the goal-striving process, one that may potentially facilitate learning goals by protecting the intention to learn against obstacles to goal completion. Interview data and responses to open-ended questions have suggested self-regulatory efficiency in these areas (e.g., Kuhl, 1985; Wolters, 1998). Further evidence of volitional control is evidenced in research utilizing experimental designs (e.g., Kanfer & Ackerman, 1989; Kuhl & Kraska, 1989).

It is important to employ various assessment methods when examining psychological constructs. Multiple assessment techniques have been beneficial to the current understanding of self-regulatory behaviors. Interview protocols, experimental designs, and observational data have highlighted various autonomous activities of students in the pursuit of academic goals. Standardized instruments like the Motivated Strategies for Learning Questionnaire (MSLQ - Pintrich, Smith, Garcia, & McKeachie, 1991) and the Learning and Study Strategy Inventory (LASSI - Weinstein, Schulte, & Palmer, 1987) were subsequently developed lending further support to earlier research findings as well as providing a basis for instructional interventions within academic settings.

Volitional research has primarily utilized interview protocols and experimental techniques. Few standardized instruments address in any great detail the breadth of volitional actions reported in recent investigations on this subject. Existing questionnaires focus generally on metacognitive and environmental control strategies, neglecting actions proposed as important to maintaining motivation on goal tasks. A need, therefore, exists for a standardized instrument incorporating a broader range of

volitional actions to supplement contemporary research explorations on this aspect of goal-striving behavior.

The goal of this study was to develop an instrument for investigating the resourcefulness and self-directedness of students in maintaining their motivation on academic goal-tasks. It is hoped that an examination of the psychometric properties of this instrument will support its usefulness in this regard. An exploration of the specific nature of volitional action under conditions requiring persistence and effort during the goal-striving process is proposed as an important next step in expanding our understanding of student motivation (Snow, et al., 1996), and the present study is directed toward supporting this goal.

Volitional Strategies

Corno and Kanfer (1993) have designated five categories of volitional control strategies within their proposed framework of the Rubicon Model (Heckhausen & Kuhl, 1985). Three of these categories, metacognitive, attentional, and environmental control, have received much attention and supportive evidence providing a connection between self-regulatory behavior and student performance (e.g., Alexander & Judy, 1988; Eccles, 1983; Pintrich & Schrauben, 1992; Pintrich, Cross, Kozma, & McKeachie, 1986; Schunk, 1991; Weinstein & Mayer, 1986). Of particular interest for this study are the two less researched categories of volitional control; strategies for regulating motivation and emotion in academic goal-striving situations. The strategic management of motivation and emotion is proposed to influence goal outcomes via their unique effects on protecting and/or maintaining an intention to learn (Corno, 1993; Corno & Kanfer, 1993; Kuhl, 1985).

The answer to whether or not students employ strategies to maintain task focus and motivation on selected academic goals appears to be "yes." Evidence demonstrating the engagement of volitional strategies is found in two exploratory studies using student interviews and open-ended questionnaire items (Kuhl, 1985; Wolters, 1998). Both studies indicated that, in addition to the reported use of cognitive and metacognitive strategies, students also acknowledged using various volitional strategies in

order to maintain motivation and to increase effort when encountering difficulty, disinterest, or distraction to task completion. Common responses given by students included thinking about wanting a good grade, reminding oneself of one's goals, providing rewards for finishing a proscribed amount of studying, imagining doing the task well, and considering the consequences of carelessness and mistakes. Based on his findings, Kuhl (1985) suggested revisiting or supplementing initial goal-choice incentives to be beneficial methods in the regulation of motivation.

In addition to cognitive and contextual factors, it seems likely that a wide range of emotions, such as anticipation, hopelessness, enjoyment, boredom, pride, and disappointment, can influence both motivational and volitional processes, thereby inhibiting or promoting successful goal outcomes (Hembree, 1988; Pekrun, 1992; Volet, 1997). In regulating emotional reactions to tasks and situational factors, both studies that explored volitional strategy use also reported responses that indicated students' use of emotion-regulation strategies. These strategies included telling oneself to calm down, focusing on one's breathing to calm down, reminding oneself of things that make them feel good, or of the various resources one could tap into for support. Strategies such as these are proposed to provide a means by which students can neutralize an overemphasis on negative states during the goal-striving process, thereby fostering a refocus on task-relevant concerns (Corno & Kanfer, 1993; Kuhl, 1985, Wolters, 1998).

The Academic Volitional Strategy Inventory (AVSI)

Existing models of self-regulated learning depict the student as an active participant in the learning process, utilizing various cognitive, metacognitive, and motivational strategies in the service of goal attainment. However, few self-report instruments currently contain items addressing emotion and motivation management. Strategies in these areas are proposed to influence the initiation and maintenance of effort toward intended goals (Corno & Kanfer, 1993; Kuhl, 1985) and, therefore, should be included when examining self-regulatory behaviors of students during the goal-striving process.

The Academic Volitional Strategy Inventory (AVSI) is a self-report instrument designed to assess the management of emotion and motivation by college students during the goal-striving process. The AVSI was developed to capture strategic methods used by students to regulate their emotion and motivation if faced with distractions threatening on-going goal activity. These volitional strategies address both the pre-actional and actional phases of the goal-striving process as conceptualized by Heckhausen (1991), and are proposed to mediate student performance from the point at which an initial goal intention is formulated through goal completion. This instrument typifies strategic actions for motivation and emotion regulation based on theoretical propositions of their existence, as well as research suggesting their role in goal-related outcomes. The validity and reliability of this instrument are discussed below. The sound psychometric properties of the AVSI suggest that it can ably serve as a tool for examining other propositions and relationships suggested to exist regarding the role of volitional control and student performance outcomes.

Validity and Reliability of the AVSI

Content Validity. According to Cronbach (1971), content validity evaluates how well the selected items on an instrument adequately sample from all possible items reflecting the behaviors of interest. The focus for the assessment of the AVSI in this regard is the connection of items to the conceptual and operational definitions of volitional characteristics.

Conceptually, the present review of the literature supports the importance of emotion and motivation regulation in student learning and performance. Selected items on the AVSI reflect regulatory actions reportedly used by students in interview sessions (Kuhl, 1985) and are consistent with discussions of self-regulatory actions believed to support the learning process (e.g., Snow, et al., 1996). As the AVSI was being developed, feedback from motivation and self-regulation researchers was solicited and incorporated, along with the input offered by students responding to various drafts of the questionnaire. Item additions, deletions, and refinements resulted from discussions of the appropriateness of various items, in order to accurately, clearly, and succinctly operationalize strategies for regulating motivation

and emotion. These suggestions and comments have been invaluable in constructing an instrument to tap into self-regulatory behaviors that students can relate to and associate with academic goal-striving situations.

Study 1: The Initial Version of the AVSI. A first draft of the AVSI was developed based on Kuhl's (1985) taxonomy of volitional strategies. The taxonomy was formulated through interviews and discussions with middle school students and teachers on strategic methods used for combating distraction to academic activities. A subsequent categorization of the taxonomy by Corno and Kanfer (1993) resulted in an elaborated set of examples representing covert volitional control (metacognitive, motivation, and emotion control) and overt volitional control (control of task situations and of others in the task setting). Primary emphasis was given by Corno and Kanfer to the two categories of strategies for emotion and motivation control. Strategies cited within the other three categories have been well-documented in the self-regulation literature (e.g., Pintrich & Schrauben, 1992; Weinstein & Mayer, 1986).

Strategies comprising the first draft of the AVSI included the sample strategies within the emotion and motivation control categories as set out by Corno and Kanfer (1993). Ten of the items in this first version of the AVSI were derived from Corno and Kanfer's taxonomy and were reworded to reflect statements or actions that college level students might use (see Table 1, Questions 1 to 10). Questions 11 to 20 were developed from personal academic and teaching experiences as well as through discussions with two colleagues working in the area. Items 21 and 22 on the questionnaire were also included to inquire about the degree to which students tended to avoid academic tasks or disengage prematurely if faced with frustration.

Table 1. Version 1 of the AVSI

Item #	Item Wording
1	When I have difficulty getting started on an academic task, or become distracted, I count to 10 and then began studying again. (E)
2	When I get off track with my studying, I think about the study schedule I have set up, and this keeps me on track . (M)
3	I think about the mistakes that I made on in my work when I have procrastinated. (M)
4	I imagined myself understanding the material and being able to easily answer a test question. (M)
5	When I am trying to get started on a task I tell myself, "this is an important exam/paper/assignment, get to it and concentrate." (M)
6	I think of different ways to make my studying more fun or challenging for me. (M)
7	When I have difficulty maintaining focus or beginning my studying I concentrate on my breathing, taking deep, slow, steady breaths. (E)
8	When I have difficulty starting an academic task or staying with a task I sing to myself. (E)
9	Whenever I am feeling frustrated about what I need to get done for my class(es), I think about things that make me feel better. (E)
10	I think about my strengths and about the resources I can draw on to help me with an academic task (e.g., paper, assignment, or studying for an exam. (E)
11	In order to begin or resume my studying, I take five to ten minutes to clear my head, then begin studying . (E)
12	I think about the academic goals I have set for myself. (M)
13	I think about the possible negative consequences of doing poorly in a class. (M)
14	I tell myself that my best grades have always occurred when I have followed my study schedule. (M)
15	I tell myself that I will have enough time to talk to my professor or TA and be able to ask for clarification if needed, if I just get down to (or back to) studying and mark any places of confusion.. (E)
16	When I am studying I tell myself, "you can do it!" (E)
17	I tell myself that the task will become interesting as I get into it, and I will be able to remember the information. (E)
18	I promise myself something I value or want as a reward for completing my study session or course assignment. (M)
19	When I get off track with my studying, I think about the study schedule that I have already set up, and this keeps me on track. (M)
20	When I have difficulty getting started on a task or can't seem to stay focused on a task, I think about why I am in college. (M)
21	I usually think of more fun or interesting things to do, and generally put off my studying or quit before I finish what I think I should complete.
22	I often get frustrated in thinking about what I need to accomplish for my classes, and usually do something else other than schoolwork to get my mind off of it.

Note: (E) = emotion control; (M) = motivation control

The 22 item questionnaire was administered to students in a "Learning to Learn" course at the University of Texas at Austin at the beginning of the Spring 1996 semester. The majority of students were in their first year of college. Students (N = 378) were presented with statements reflecting emotion

and motivation regulation strategies and were asked first to indicate whether they had ever used any of the strategies listed by checking yes or no. If they responded "yes," they were then asked to rate the statements on a five-point scale, anchored by 1 = "I almost never do this" and 5 = "I almost always do this." At the end of the questionnaire students were also asked to list any other things they said or did that helped them initiate studying or stay focused on an academic task.

This first wave of data collection served primarily to examine if any of the proposed strategies were used, and to explore other possible strategies engaged by college students for managing their motivation or emotional states. Because a portion of the strategies listed were based on Kuhl's (1985) interview data with middle school students, this investigation sought to elicit additional methods that might be invoked by college students.

Results indicated moderate to high strategy usage as students attempted to complete course requirements. We found that 53% to 96% of students reported using 18 of the 20 strategies at least some of the time. Fewer than half the sample reported ever using the following four strategies: counting to 10 (5%); taking deep breaths (17%); singing to oneself (21%) and thinking of different ways to make studying more fun (44%). Indeed, even if one did use any of these four strategies, the actual frequency of use was quite low, averaging between "almost never" to "less than half the time."

The most frequently endorsed strategies were: thinking about possible negative consequences (96%); thinking about the academic goals one has set (91%); and telling oneself that the task is important and to get to it and concentrate (90%). On average, students reported engaging in these three latter strategies "half the time" to "more than half the time." In addition, the strategy of thinking about how they usually do fine if they stick to their study schedule fell just below the "half the time" use designation.

As mentioned above, this administration of the instrument also sought to elicit from students other strategies used by them that have proven helpful in the initiation and maintenance of focus on course tasks. Another round of discussions with colleagues familiar with the literature on volition and

self-regulatory processes took place to consider the various strategies provided by students. As a consequence, twelve additional statements were constructed and added to the questionnaire (see Table 2)

Table 2. Strategy Items added to Version 2 of the AVSI

Item #	Item Wording
23	I think about how disappointed others (family/friends) will be if I do poorly. (M)
24	I call a friend from class and discuss the assignment or material with them. (E)
25	I listen to music (e.g., classical, soft, instrumentals) to relax me and help clear my head when I need to get down to studying, or if I become frustrated while studying. (E)
26	I exercise for about a 1/2 hour before I begin studying to clear my head and help me get relaxed. (E)
27	I think about the kinds of jobs/careers I may end up with if I flunk out of college. (M)
28	I think about how great (how relieved) I'll feel when I get this finished. (M)
29	I think about how others in my class are probably studying (or working on the assignment) now, and that they will get a better grade than me. (M)
30	I think about the sacrifices that I have made, or that my parents are making to put me through school. (M)
31	I use a form of relaxation techniques or meditation to help me relax so I am better able to work on the academic task. (E)
32	I seek spiritual guidance for the strength to tackle, or to persist, on academic tasks that I don't want to begin, or that I get distracted from, frustrated, or bored with while working on them. (E)
33	I talk out loud to myself about what I am studying to keep me from getting distracted. (E)
34	I schedule regular study hours with a friend from class so that I won't get behind on my course requirements and feel bad/stressed/guilty by putting off studying. (E)

Note: (E) = emotion control; (M) = motivation control

Study 2: The Second Version of the AVSI. A second Spring 1996 administration of the instrument in its new 34-item form was responded to by students from an upper-division elective course offered within the Department of Educational Psychology at the University of Texas (N = 463). Students participated as part of a course requirement in their class and attended one of several research sessions offered outside of class time. The sessions began approximately three to four weeks into the semester and continued until close to three weeks prior to the semester's end. Students used the same 1 to 5 frequency scale ("I never do this" to "I always do this") as used in the previous administration of the questionnaire.

Results indicated that the four least used strategies here were consistent with what was found in the prior study. Counting to 10, taking deep breaths to counter frustration, singing to oneself, and thinking of different ways to make studying more fun had means ranging from 1.4 to 2.1 (i.e., between "I

never do this" and "I do this less than half the time"). Two of items that were added also received relatively low mean frequency ratings; means for exercising prior to beginning studies, using some form of relaxation technique to aid focus, studying with a friend, and seeking spiritual comfort or guidance ranged from 1.9 to 2.2

The more frequently used strategies were also consistent with the results of the previous study. Thinking about possible negative consequences, thinking about the academic goals one has set, and telling oneself that the task is important and to get to it and concentrate received ratings ranging from 3.2 to 3.7 (i.e., between "I do this about half the time" to "I do this more than half the time"). Additional strategies receiving high mean frequency ratings included sticking to a set out study schedule, thinking about the relief of completing an assignment, the reasons one is in college, the goals one has set for oneself, the negative consequences of doing poorly, and the rewards promised oneself upon task completion. Ratings on these strategies ranged from 3.2 to 4.4

Overall, results point to strategy use for regulating motivation and emotion as conceptualized by Kuhl (1985). These results indicate that perhaps a few of the strategies found by Kuhl during interviews with younger students may be less appropriate or adequate for regulating action by older students. Nevertheless, some students did report using strategies such as counting to 10 or taking deep breaths, although they were in the minority. Because meta-level awareness is seen to emerge as students mature, as well as higher levels of commitment to studying (Volet & Lawrence, 1989; Volet & Lund, 1994), students may ultimately develop more sophisticated strategies as they progress through the various levels of the educational system. These strategies may then reflect an increased awareness of one's ability to control both external and internal elements related to the attainment of desired goals.

Construct Validity. To investigate the construct validity of the AVSI in reflecting motivation and emotion regulation, an exploratory factor analysis was performed on the data from this second administration of the instrument. The two statements addressing a tendency to quit or to engage in more fun activities when frustrated were excluded from this analysis, since these were not strategies per se. Two factors

emerged that appeared to separate the 32 strategies into categories depicting incentive escalation (or motivation control) and stress reduction (or emotion control).

Results generally indicated that strategies anticipated to exemplify motivational self-regulation loaded on one factor, and included actions such as thinking of possible negative consequences of doing poorly, disappointing others, recalling one's goals and reasons for being in college, among others. Strategies related to emotion regulation included concentrating on one's breathing when frustrated, scheduling study hours with classmates to avoid procrastination, thinking about things that make them feel better, and exercising prior to studying to release excess energy. Item loadings on both factors tended toward consistency with the operational definitions of emotion and motivation regulation (Corno & Kanfer, 1993; Kuhl, 1984). Three strategies, however, loaded on the factor opposite from what was expected (i.e., rewarding oneself upon task completion (an emotion regulation item), thinking of interesting ways to study (a motivation regulation item), and considering strengths and resources in tackling academic tasks (an emotion regulation item)). Overall, the above-performed analyses tend to support the categorization structure presented by Corno and Kanfer (1993).

The results of the studies point to the potential usefulness of the AVSI for identifying self-regulatory actions aiding in the maintenance of goal-striving behavior not captured by existing instruments. The AVSI appears to better elaborate on the specific nature of ways in which students garner effort and persistence on academic tasks. Existing instruments are either lacking in volitional items of this nature or phrase them in a vague manner (e.g., "Even when course materials are dull and uninteresting, I manage to keep working until I finish;" "I work hard to do well in this class even if I don't like what we are doing." - MSLQ; Pintrich, et al., 1991). Nevertheless, further evidence was needed to more soundly support this instrument as a tool to identify self-regulatory behaviors important in goal-striving situations.

Study 3: The Current Version of the AVSI. Refinement of the AVSI continued based upon the two previous studies. Items that consistently received low frequency ratings were given particular

attention: students were asked about the utility of these items, and the wording and content of these questions were discussed with colleagues familiar with the volitional literature and a national expert in the field.

Consequently, two items were dropped (singing to self and seeking spiritual guidance/comfort), and several were slightly reworded in an effort to state the strategy in a more succinct or clear manner (e.g., "rewarding myself" was reworded in terms of things or activities that students find attractive, such as buying a C.D., getting together with friends, or seeing a movie). Additionally, the two items reflecting student inclinations toward giving in to frustration or more attractive activities were dropped from the questionnaire. These questions were initially included to explore the frequency with which students tended to give in to temptation or frustration and avoid on-going task requirements, as opposed to exerting effort in general. The majority of students reported occasionally succumbing, which is not surprising given the many goals that students juggle during the course of a semester. Further, the goal of this instrument is to discover strategic methods associated with positive learning outcomes, and these two items do not suggest specific behaviors in that regard. Therefore, it was decided that they would not be included in the current version of the AVSI. The current version of the questionnaire now contains thirty items (see Table 3).

Participants for this study were recruited from an upper-division introductory statistics course in the Educational Psychology Department at the University of Texas at Austin (N = 246). The students who participated in this study were fulfilling a course research requirement during the Spring 1998 semester. Students were requested to attend one of many 1-hour sessions set up during the months of March and April, 1998.

Table 3. The Current Version of the AVSI

Item #	Item Wording
1	I promise myself something I want when I complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD, etc.).
2	I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying.
3	When I can't get down to studying or get if I get frustrated or interrupted during studying, I count to 10 to help me get on track with it.
4	I think about how disappointed others (family/friends) will be if I do poorly.
5	I think about why I am going to college (e.g., about my future plans).
6	I tell myself that I will be able to understand and remember this course material.
7	I call a friend from class and discuss the assignment or material with them.
8	I put on background music (e.g., classical, soft, instrumentals) to relax me.
9	I tell myself, "you can do this!"
10	I think about my other coursework, and that if I don't get going or continue this study session I'll fall behind in the assignments for the rest of my courses.
11	I think about the mistakes that I have made on past assignments and exams when I've procrastinated in my studying.
12	I exercise for about a 1/2 hour before I begin studying to clear my head and help me get relaxed.
13	I think about the kinds of jobs/career I may end up with if I flunk out of college.
14	I tell myself that I have gotten my best grades when I stick to a study schedule.
15	I concentrate on my breathing, taking deep, steady, slow breaths to help me focus before beginning my studying, or to help me resume my studying if I get distracted, frustrated, or bored while studying.
16	I imagine myself moving through the assignment or answering the test questions without much difficulty.
17	I think about how great (how relieved) I'll feel when I get this finished.
18	I think about the amount of time my classmates probably study for this class, and that they will get a better grade than me.
19	I tell myself, "get to it and concentrate, this is an important exam/paper/assignment."
20	I think about the sacrifices that I have made, or that my parents are making to put me through school.
21	I tell myself that I will have enough time to talk to my professor, T.A., or other classmates for help if needed, if I just get down to (or back to) my studying.
22	I think of interesting or different ways to make studying more fun or challenging for me.
23	I think about the goals I have set for myself (how what I do now may affect my future).
24	I usually meditate or use some form of relaxation techniques so I am better able to concentrate on my studies.
25	I think about the possible negative consequences of doing poorly in the class.
26	I take a five to ten minute break to clear my head when I want to quit studying but know I should stay with it.
27	I think about my strengths and the resources that I can draw on to help me with difficult assignments or test information.
28	I think about things that make me feel good whenever I am feeling frustrated about what I need to get done for this class.
29	I schedule regular study hours with a friend from class so that I won't get behind on my class assignments and feel bad/stressed/guilty for putting off studying.
30	I talk aloud to myself about the material I'm studying to keep me from getting distracted by other thoughts or activities.

An exploratory factor analysis was performed on the questionnaire items of this most current version of the AVSI. A two-factor solution (varimax rotation) was first imposed, based on results of pilot data and on theoretical conceptualizations of motivation and emotion management in goal-striving situations. The two-factor structure accounted for approximately 30 percent of the total variance. However, item loadings for each factor did not clearly separate in the theoretically expected manner, nor as found in the data from the second study. Eleven items loaded in the opposite direction: four that were conceptualized as regulating motivation fell into the emotion management factor and seven items originally believed to exemplify the regulation of emotion loaded on the motivational control factor (see Table 4).

Table 4. The two-factor solution.

Item #	Item Wording	Factor Loading F1	F2
Factor 1: ~~Emotion~~ Motivation Regulation			
2	I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying.	.52	.03
4	I think about how disappointed others (family/friends) will be if I do poorly.	.43	.22
5	I think about why I am going to college (e.g., about my future plans).	.61	.01
9	*I tell myself, "you can do this!"*	*.50*	*.36*
10	I think about my other coursework, and that if I don't get going or continue this study session I'll fall behind in the assignments for the rest of my courses.	.51	.16
11	I think about the mistakes that I have made on past assignments and exams when I've procrastinated in my studying.	.64	-.07
12	*I exercise for about a 1/2 hour before I begin studying to clear my head and help me get relaxed.*	*.27*	*.21*
13	I think about the kinds of jobs/career I may end up with if I flunk out of college.	.47	.20
14	I tell myself that I have gotten my best grades when I stick to a study schedule.	.64	.18
17	I think about how great (how relieved) I'll feel when I get this finished.	.50	.21
19	I tell myself, "get to it and concentrate, this is an important exam/paper/assignment."	.54	.24
20	I think about the sacrifices that I have made, or that my parents are making to put me through school.	.57	.00
21	*I tell myself that I will have enough time to talk to my professor, T.A., or other classmates for help if needed, if I just get down to (or back to) my studying.*	*.47*	*.34*
23	I think about the goals I have set for myself (how what I do now may affect my future).	.66	.00
25	I think about the possible negative consequences of doing poorly in the class.	.52	-.03
26	*I take a five to ten minute break to clear my head when I want to quit studying but know I should stay with it.*	*.45*	*-.00*
27	*I think about my strengths and the resources that I can draw on to help me with difficult assignments or test information.*	*.52*	*.44*
28	*I think about things that make me feel good whenever I am feeling frustrated about what I need to get done for this class.*	*.49*	*.48*

30	*I talk aloud to myself about the material I'm studying to keep me from getting distracted by other thoughts or activities.*	*.24*	*.13*

Factor 2: Emotion Regulation

1	*I promise myself something I want when I complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD, etc.).*	*.04*	*.34*
3	When I can't get down to studying or get if I get frustrated or interrupted during studying, I count to 10 to help me get on track with it.	-.06	.54
6	*I tell myself that I will be able to understand and remember this course material.*	*.20*	*.26*
7	I call a friend from class and discuss the assignment or material with them.	.20	.46
8	I put on background music (e.g., classical, soft, instrumentals) to relax me.	-.06	.22
15	I concentrate on my breathing, taking deep, steady, slow breaths to help me focus before beginning my studying, or to help me resume my studying if I get distracted, frustrated, or bored while studying.	.13	.57
16	I imagine myself moving through the assignment or answering the test questions without much difficulty.	.12	.63
18	*I think about the amount of time my classmates probably study for this class, and that they will get a better grade than me.*	*.33*	*.41*
22	*I think of interesting or different ways to make studying more fun or challenging for me.*	*.11*	*.53*
24	I usually meditate or use some form of relaxation techniques so I am better able to concentrate on my studies.	.07	.67
29	I schedule regular study hours with a friend from class so that I won't get behind on my class assignments and feel bad/stressed/guilty for putting off studying.	.14	.55

Note. Italicized items are those that loaded on the factor opposite from what was expected.

As the purpose of this two-factor request was to establish construct validity, the factor structure that resulted made the interpretation of the two sub-scales as emotion and motivation regulation strategies somewhat blurry due to the large number of items shifting in position. In an effort to better clarify the latent structure of the AVSI items, a further exploration of the factor structure was undertaken. Without designating a specific number of factors, a principle components analysis and varimax rotation resulted in eight factors that had eigenvalues greater than 1.0 (see Table 5).

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Table 5 The eight-factor solution

Item #	Item Wording	Factor Loadings							
		F1	F2	F3	F4	F5	F6	F7	F8
Factor 1: "Self-talk"									
2	I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying	.61	.03	-.19	.08	.02	.41	-.06	-.03
9	I tell myself, "you can do this!"	.51	.18	.27	.06	.12	.23	.00	.19
10	I think about my other coursework, and that if I don't get going or continue this study session I'll fall behind in the assignments for the rest of my courses	.67	.10	.13	.17	-.02	-.03	-.11	-.13
11	I think about the mistakes that I have made on past assignments and exams when I've procrastinated in my studying	.68	.28	-.08	.01	.00	-.15	.08	.05
14	I tell myself that I have gotten my best grades when I stick to a study schedule	.57	.20	.03	.13	.09	.33	.17	-.03
17	I think about how great (how relieved) I'll feel when I get this finished	.55	.05	.01	.13	.21	.15	.22	.09
19	I tell myself, "get to it and concentrate, this is an important exam/paper/assignment "	.49	.21	.40	-.10	.05	.15	.19	-.01
21	I tell myself that I will have enough time to talk to my professor, T.A., or other classmates for help if needed, if I just get down to (or back to) my studying	.36	.20	.26	.21	.25	.02	.25	-.10
Factor 2: "Negative Consequences"									
4	I think about how disappointed others (family/friends) will be if I do poorly	.32	.52	.05	.21	.12	-.20	-.35	.17
5	I think about why I am going to college (e.g., about my future plans)	.17	.66	.05	.07	-.15	.31	.11	-.05
13	I think about the kinds of jobs/career I may end up with if I flunk out of college	.04	.68	.03	.19	.17	-.02	.08	.21
20	I think about the sacrifices that I have made, or that my parents are making to put me through school	.15	.72	.12	.01	-.12	.06	.05	.01
23	I think about the goals I have set for myself (how what I do now may affect my future)	.22	.63	-.03	-.07	.12	.36	.08	-.18
25	I think about the possible negative consequences of doing poorly in the class	.29	.48	.02	.03	.23	-.34	.13	-.27
Factor 3: "Concentration Strategies"									
3	When I can't get down to studying or get if I get frustrated or interrupted during studying, I count to 10 to help me get on track with it	-.05	-.01	.68	.12	.15	.00	-.10	-.13
15	I concentrate on my breathing, taking deep, steady, slow breaths to help me focus before beginning my studying, or to help me resume my studying if I get distracted, frustrated, or bored while studying	.11	.04	.71	.16	-.02	.22	.09	.06
24	I usually meditate or use some form of relaxation techniques so I am better able to concentrate on my studies	.05	.16	.55	.28	.13	.11	-.20	.34
30	I talk aloud to myself about the material I'm studying to keep me from getting distracted by other thoughts or activities	.34	.01	.37	-.33	.13	-.16	.27	.29

Table 5 (continued)

Item #	Item Wording	F1	F2	F3	F4	F5	F6	F7	F8
Factor 4: "Socializing Strategies"									
7	I call a friend from class and discuss the assignment or material with them	.21	.01	.08	.59	.21	.08	-.04	-.11
12	I exercise for about a 1/2 hour before I begin studying to clear my head and help me get relaxed	.15	.09	.08	.58	-.25	.02	.47	.12
16	I imagine myself moving through the assignment or answering the test questions without much difficulty	.11	.12	.26	.40	.30	.23	-.31	.17
18	I think about the amount of time my classmates probably study for this class, and that they will get a better grade than me	.25	.31	.15	.38	.35	-.22	-.15	-.05
29	I schedule regular study hours with a friend from class so that I won't get behind on my class assignments and feel bad/stressed/guilty for putting off studying	.03	.10	.19	.71	.13	.04	.09	.02
Factor 5: "Self-Reinforcement"									
1	I promise myself something I want when I complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD, etc.)	.09	-.12	-.06	.06	.69	.00	.06	.09
22	I think of interesting or different ways to make studying more fun or challenging for me	.01	.09	.26	.12	.62	.03	.04	.07
28	I think about things that make me feel good whenever I am feeling frustrated about what I need to get done for this class	.29	.21	.17	.23	.47	.37	.18	-.04
Factor 6: "Self-Encouragement"									
6	I tell myself that I will be able to understand and remember this course material	.09	.06	.17	.04	-.02	.66	-.03	.04
27	I think about my strengths and the resources that I can draw on to help me with difficult assignments or test information	.34	.23	.21	.12	.34	.55	.05	-.08
Factor 7: "Taking Breaks"									
26	I take a five to ten minute break to clear my head when I want to quit studying but know I should stay with it	.18	.20	-.06	.06	.21	.00	.72	.04
Factor 8: "Relaxing Music"									
8	I put on background music (e.g., classical, soft, instrumentals) to relax me	.00	.01	.00	-.03	.11	.00	.04	.84

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Although the eight-factor solution was interpretable and did provide evidence for the distinction between motivation and emotion regulation strategies, the fact that there were two factors that consisted of a single item and the lack of parsimony demonstrated in this exploratory factor analysis led us to test yet one more factor solution.

A three-factor structure was next requested (principal components analysis and varimax rotation), and resulted in a conceptually clear division of items reflecting: 1) reassuring thoughts; 2) stress reduction or "calming" actions; and 3) thoughts about negative consequences of doing poorly on assignments and/or tests. Table 6 displays the factor loadings for each of the three extracted factors. The questions are sorted according to the factors on which they loaded most highly, save for one. Item 12 ("I exercise for about a 1/2 hour before I begin studying to clear my mind and help me get relaxed") loaded slightly more highly on the reassuring thoughts and negative consequences factors, but fits most clearly within the stress reduction factor. Because of the equivocal factor loadings and for sake of conceptual coherence, this item was placed within the stress reduction category.

Table 6. The three-factor solution.

Item #	Item Wording	Factor Loading F1	F2	F3
Factor 1: "Reassurance"				
2	I remind myself that I usually do fine on exams and/or other course assignments when I stay on track with my studying.	.64	-.06	.06
6	I tell myself that I will be able to understand and remember this course material.	.48	.18	-.21
9	I tell myself, "you can do this!"	.55	.28	.17
10	I think about my other coursework, and that if I don't get going or continue this study session I'll fall behind in the assignments for the rest of my courses.	.44	.10	.30
14	I tell myself that I have gotten my best grades when I stick to a study schedule.	.67	.08	.23
17	I think about how great (how relieved) I'll feel when I get this finished.	.55	.13	.17
19	I tell myself, "get to it and concentrate, this is an important exam/paper/assignment."	.58	.16	.18
21	I tell myself that I will have enough time to talk to my professor, T.A., or other classmates for help if needed, if I just get down to (or back to) my studying.	.40	.30	.31
23	I think about the goals I have set for myself (how what I do now may affect my future).	.48	-.06	.45
26	I take a five to ten minute break to clear my head when I want to quit studying but know I should stay with it.	.36	-.05	.27

27	I think about my strengths and the resources that I can draw on to help me with difficult assignments or test information.	.65	.35	.10
28	I think about things that make me feel good whenever I am feeling frustrated about what I need to get done for this class.	.53	.42	.19
30	I talk aloud to myself about the material I'm studying to keep me from getting distracted by other thoughts or activities.	.30	.09	.03
Factor 2: "Stress Reduction"				
1	I promise myself something I want when I complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD, etc.).	.09	.33	.00
3	When I can't get down to studying or get if I get frustrated or interrupted during studying, I count to 10 to help me get on track with it.	.02	.54	- 04
7	I call a friend from class and discuss the assignment or material with them.	.15	.45	.20
8	I put on background music (e.g., classical, soft, instrumentals) to relax me.	-.01	.22	- 06
12	I exercise for about a 1/2 hour before I begin studying to clear my head and help me get relaxed.	.19	.18	.22
15	I concentrate on my breathing, taking deep, steady, slow breaths to help me focus before beginning my studying, or to help me resume my studying if I get distracted, frustrated, or bored while studying.	.31	.53	- 07
16	I imagine myself moving through the assignment or answering the test questions without much difficulty.	.14	.63	.12
22	I think of interesting or different ways to make studying more fun or challenging for me.	.10	.52	.12
24	I usually meditate or use some form of relaxation techniques so I am better able to concentrate on my studies.	.09	.70	.09
29	I schedule regular study hours with a friend from class so that I won't get behind on my class assignments and feel bad/stressed/guilty for putting off studying.	.04	.56	.25
Factor 3: "Negative Self-Talk"				
4	I think about how disappointed others (family/friends) will be if I do poorly.	.04	.23	.63
5	I think about why I am going to college (e.g., about my future plans).	.40	-.04	.47
11	I think about the mistakes that I have made on past assignments and exams when I've procrastinated in my studying.	.42	- 12	.47
13	I think about the kinds of jobs/career I may end up with if I flunk out of college.	.10	.20	.63
18	I think about the amount of time my classmates probably study for this class, and that they will get a better grade than me.	.04	.43	.52
20	I think about the sacrifices that I have made, or that my parents are making to put me through school.	.23	- 02	.59
25	I think about the possible negative consequences of doing poorly in the class.	.11	- 02	.70

The above factor analyses reflect the regulation of motivation and emotion by students in initiating and maintaining goal-directed behavior. But, as we saw earlier, a two-factor solution did not distinctly separate the 30 items into conceptually clear categories in this regard as discussed in the taxonomy provided by Corno and Kanfer (1993). The difficulty in achieving such a separation may perhaps be a function of attempting an artificial division between emotion and motivation strategies.

Factors related to prompting and maintaining motivated behavior on goal-directed activities appear to be integrally associated with emotional feelings toward various tasks and situations in both the pre- and post-decisional phases of goal-striving (e.g., Fridja, 1986; Pekrun, 1992; Schunk, 1991; Volet, 1997; Zimmerman, 1990).

A closer examination of the strategies comprising the AVSI reveals that each of the items can be seen to either quell an overly emotional response to a task or situation, or to prompt an emotional reaction in an attempt to initiate or maintain goal-directed action. For example, when a student uses a strategy such as thinking about the disappointment his or her parents might feel in hearing about the student's poor performance, (s)he is attempting to evoke an emotional response to promote task action. Calling a friend in class to discuss confusing or frustrating material or assignments appears to quiet an overly aroused emotional state, which may otherwise inhibit or threaten task action. These two items have been conceptualized respectively as strategies for motivation and emotion regulation, however, it is clear that emotional feelings are involved in both of these strategies.

A re-examination of the second pilot study data revealed a very similar structure to that found in this present data set. Shifting of items among the sub-scales occurred minimally, with strategies for decreasing emotional arousal moving within the reassuring self-talk and stress-reduction sub-scales. Items 6 (imagining the material becoming interesting), 21 (talking to professor), and 30 (talking aloud about the material) moved from the stress-reduction category to the reassurance sub-scale; items 1 (remember a promised reward) and 16 (imagining the information as easily understandable) moved from the stress-reduction to reassurance sub-scale. Otherwise, the factor structures were identical.

The three-factor structure appears to more clearly describe the nature of self-regulatory thoughts and actions students engage to facilitate goal action and prevent procrastination or early disengagement. These sub-scale designations are consistent with theoretical notions on managing emotion and motivation. Therefore, in terms of construct validity, the three-factor solution offered the parsimony and easily interpretable latent structure we were seeking. Although the emotion regulation – motivation regulation

dichotomy did not emerge, the three distinct families of volitional strategies offered by this solution were consistent with the theoretical premises established and previous research done in this area. It is the three-factor solution that we offer as an empirically-based taxonomy of the AVSI, and one that we suggest is sound evidence for the instrument's construct validity.

Reliability. Both the internal consistency of the AVSI, as well as its stability in measuring the self-regulatory actions of interest, are aspects important to assessing the potential usefulness of the AVSI. Cronbach's Alpha, which is suggested to be the preferred measure for evaluating the internal consistency of an instrument (Gable & Wolf, 1993), was used to obtain reliability estimates of AVSI items in this regard. To investigate the stability of AVSI scores over time, the AVSI was administered twice to a subset of students from the Spring 1998 study.

Sub-scales were created based on the three-factor solution and the coefficient alphas computed showed good internal consistency. Sub-scale alphas were .82 for reassurance, .69 for stress reduction, and .73 for negative self-talk; the alpha for the entire 30-item scale was .87. As for test-retest reliability, a four-week gap between the pre- and post-tests showed that AVSI scores were correlated .72. These are solid numbers for these two aspects of reliability, adding further testimony for the merits of this instrument.

Conclusions and Future Directions

The above psychometric assessments provide evidence for the utility of the AVSI in measuring self-regulatory actions related to maintaining effort and motivation on goal-directed activity. We do acknowledge the limitations of the data here, and do want to note that this is still a work in progress. Additional data was collected in the Spring 1998 study, and analyses are still being done to further test and document the psychometric properties of the AVSI. We now turn to a discussion of those additional lines of inquiry.

Convergent and Divergent Validity. A multi-trait analysis will be conducted in order to establish whether the AVSI will correlate with a specific set of other measures in a manner that is consistent with the theoretical framework articulated by Kuhl and his colleagues. Such instruments include the Action-Control Scale (Kuhl, 1986), the Negative Mood Regulation Scale (Catanzaro & Mearns, 1990), the Rosenberg Self Esteem Scale (1965), and the effort sub-scale of the MSLQ (Pintrich, et al., 1991).

An action orientation, as measured by the Action-Control Scale, should indicate student engagement in self-regulatory action rather than a rumination on frustrations or past failures, thus facilitating the engagement of AVSI strategies. The ability to regulate negative moods, as measured by the Mood Regulation Scale, is expected to show significant correlations with other self-regulatory actions such as those in the areas of emotion and motivation regulation. High scores on the Self Esteem Scale is proposed to predispose students towards tackling frustrating situations and engaging self-regulatory actions such as those found in the AVSI to overcome hurdles in academic striving. And finally, the level of effort expenditure as measured by the MSLQ is expected to correlate significantly with self-regulatory actions for emotion and motivation management as measured by the AVSI.

Evaluations of divergent validity will attempt to show that the AVSI does not overlap with measures of cognitive engagement. Instead it is predicted that the AVSI will provide a mediating function with respect to cognitive engagement in academic tasks (cf. Garcia, McCann, Turner & Roska, 1998). Traditional motivational theories suggest that effort and persistence in on-task behavior result from the strength of goal-choice constructs (i.e., expectancy-value determinants). This assessment of divergent validity will therefore attempt to show that emotion and motivation regulation strategies form distinct categories of strategy implementation that are working simultaneously, or in conjunction with the enactment of cognitive and metacognitive strategies that have been associated with learning outcomes during goal implementation.

In this regard, two sets of analyses will be conducted. In order to establish the independence of volitional constructs (as measured by the AVSI) from cognitive and metacognitive strategies, the AVSI

and the learning strategy scales of the MSLQ will be incorporated into a factor analysis. The expectation here is the emergence of separate factors corresponding to the different classes of regulatory strategies. The second set of analyses will be a series of hierarchical regressions, conducted in order to establish the mediating role of volition in the self-regulatory process (see Garcia et al., 1998).

Predictive Validity. A final measure of the validity of the ASVI will be determined through assessing its items capacity for predicting student performance. Correlations between volitional strategy use, as measured by the AVSI, and final grade in the course will be analyzed. It is expected that positive correlations will emerge, showing that emotion and motivation regulation correspond with greater success in course outcome. In addition, regression analyses will be performed to assess expected increases in variance for course performance attributable to the engagement of volitional strategies, over and above that of cognitive and metacognitive strategy use, as measured by the learning scales of the MSLQ.

According to action control theory (Kuhl, 1984), inquiries into self-regulated behaviors concerning academic learning require an expansion of current diagnostic and investigative methods. The validation of the AVSI is a step in that direction. Of course, questions surrounding the psychometric adequacy of this instrument must be first fully addressed before its use as a tool for assessing its role in academic performance is warranted: the preliminary work reported here suggests that the AVSI is indeed a promising research instrument. Although it is only one method by which volitional actions should be examined, self-report instruments are suggested to be an integral aspect to answering questions thus far only speculated upon with regard to the role of volitional activity in the learning process.

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